Ref 7/D

PLANT INTRODUCTION NEWSLETTER

Issued by Crop Production and Improvement Branch, Plant Production and Protection Division, Food and Agriculture Organization of the United Nations, Rome, Italy

No. 7 April, 1960

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NOTES

1. These Newsletters represent informal communications addressed only to persons who are directly and actively interested in plant exploration, collection and introduction.

2. It is regretted that it is not possible to issue complete versions of these Newsletters in the three working languages of FAO - English, French and Spanish. As news items are, however, included in the original language the Newsletter is thus published in a trilingual form.

3. The earlier issues of this Newsletter contained reports of expeditions planned or in progress. It would be greatly appreciated if those concerned could send a report of these expeditions as soon as possible for inclusion in a later issue of the Newsletter.

4. All correspondence with regard to the above items should be addressed to the institutes or specialists concerned, or to: Dr. R.O. Whyte, Chief, Crop Production and Improvement Branch, FAO, Rome, Italy. Those wishing to be included on the mailing list for further issues of these Newsletters are requested to inform the above if they have not already done so.

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99. Introduction et échange de plantes entre les pays de la zone inter-tropicale *

Guy Perrin de Brichambaut
Sous-Division de la Production végétale et
de l'Amélioration des Plantes, FAO, Rome

A la Dixième Session de la Conférence de la FAO, les délégués des pays membres de cette organisation ont demandé avec insistance que la campagne pour l'introduction et l'échange des plantes déjà entreprise par la FAO soit développée aussi largement que possible. Jusqu'à ce jour, la Sous-Division de la Production végétale et de l'Amélioration des Plantes a organisé systématiquement l'échange et l'expérimentation des variétés cultivées dans les pépinières uniformes de la région méditerranéenne, alors que pour d'autres régions la FAO a assuré la liaison entre les organisations de recherche pouvant fournir ou vendre des semences sélectionnées et les spécialistes désirant introduire du matériel amélioré. La FAO a conseillé divers pays dans l'établissement de projets d'introduction de plantes et a diffusé, soit directement, soit par l'intermédiaire de la "Plant Introduction Newsletter" des renseignements sur ce sujet. De nombreux articles, notes et études (Voir l'étude agricole de la FAO No. 41 intitulée "Prospection, récolte et introduction de plantes") ont mis en valeur l'importance que représente l'introduction des plante pour l'amélioration de la production agricole.

Les pays inter-tropicaux qui jouissent d'un climat chaud ont déjà profité de cet échange de plantes. Malgré les énormes distances qui séparent les continents, les migrations humaines et les échanges commerciaux ont favorisé l'introduction, la multiplication de certaines cultures et des mauvaises herbes, volontairement ou accidentellement (emballages, provisions de bord, etc.). Quelques espèces présentant un intérêt économique ont été rassemblées puis introduites dans des pays où elles ne croissent pas naturellement : café, cacao, manioc, caoutchouc, ananas et différentes espèces fourragères, cultivés maintenant dans les pays tropicaux de trois ou quatre continents, sont seulement originaires de l'un d'eux. Néanmoins, les espèces introduites ont souvent été cultivées à partir d'un petit nombre d'échantillons de semences ou d'un nombre limité de plants, comme par exemple Digitaria decumbens et des espèces de Panicum et Pennisetum; les formes spontanées des variétés tropicales cultivées n'ont été systématiquement récoltées qu'en de rares occasions en dépit de la grande importance qu'elles présentent pour les généticistes. La diversité de la flore tropicale dans les différents continents et l'importance acquise par les espèces introduites au cours des siècles passés démontrent clairement que ces échanges peuvent être largement développés pour le plus grand bien des pays tropicaux.

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* For English version, see page 4.

Les méthodes utilisées pour l'introduction d'espèces nouvelles dans les pays méditerranéens et tempérés ne sont pas toujours utilisables dans la région tropicale où la reproduction de nombreuses espèces se fait souvent par voie végétative, où la multiplication par clône des espèces sélectionnées est quelquefois nécessaire et où enfin la production de semences est parfois très faible et leur stockage difficile. Le transport d'organes végétatifs présente sans aucun doute beaucoup de problèmes : il doit être rapide pour permettre une bonne conservation des plantes et le matériel est encombrant et lourd en raison de sa teneur en eau très élevée. Le transport par avion est presque toujours nécessaire, mais son prix élevé limite considérablement l'importance des envois. D'autre part, des parasites et maladies peuvent être introduits accidentellement avec les organes végétatifs et un contrôle sanitaire très strict doit être observé pendant la période de quarantaine avant que l'on puisse distribuer les plantes introduites. L'expédition des semences est souvent rendue difficile à cause de l'humidité de l'air et les échantillons doivent quelquefois être séchés artificiellement pour que les semences ne chauffent pas et ne perdent pas toute leur faculté germinative. Enfin, l'activité des botanistes dans la zone tropicale comme ailleurs se traduisant souvent par l'adoption de nouveaux noms pour les espèces déjà connues, il s'ensuit une confusion dans les pays introduisant des espèces d'autres continents. En conséquence, les pays distribuant les plantes devraient les conserver dans une collection vivante de référence et les identifier, de manière que leur identité ne change pas quels que soient les noms successifs qui pourront leur être attribués.

Dans la zone tropicale, la campagne pour l'échange des plantes entre les différents pays de la zone devrait être organisée avec beaucoup de soin pour pouvoir porter tous ses fruits. L'exploration et l'introduction du matériel pourraient être centralisées dans certains centres afin de faciliter le travail d'observation et de multiplication et présenter toutes les garanties du point de vue taxonomique, génétique et phytosanitaire. Dans l'immédiat, on pourrait envisager la sélection de quelques centres régionaux parmi les plus caractéristiques dans chacune des principales régions écologiques; quatre ou cinq centres dans chaque continent devraient suffire pour la période de démarrage. Evidemment, chacun des centres régionaux pourrait travailler en association avec des centres nationaux qui multiplieraient les espèces spontanées ou importées et récolteraient les plants spontanés provenant des environs.

Chaque centre régional devrait posséder un équipement suffisant, d'une part, pour cultiver une collection vivante de plantes spontanées, pour multiplier les espèces qui présentent le plus d'intérêt pour les spécialistes d'autres régions, pour expédier des semences et des organes végétatifs aux autres centres régionaux et, d'autre part, pour cultiver le matériel importé d'autres continents, pour assurer le contrôle phytosanitaire au cours de la période de quarantaine, pour multiplier et expérimenter les espèces reçues et enfin pour distribuer ce matériel dans la région. Pendant les premières années, le travail du centre devra probablement se limiter à l'échange d'espèces appartenant à un groupe donné de plantes présentant un intérêt économique (par exemple plantes de couverture, plantes fourragères, espèces indigènes), afin que chaque centre dispose d'assez de temps pour s'organiser et réunir une collection aussi complète que possible.

Pour mener à bien toutes ces opérations on devrait recruter sur chaque centre régional un technicien qui aurait la responsabilité du programme d'introduction et de multiplication. Ce technicien devrait être suffisamment secondé par un adjoint, des contremaîtres et des ouvriers agricoles et disposer d'un terrain permettant d'installer des parcelles expérimentales et d'entreprendre le travail de multiplication. Dans de nombreux cas on devrait adjoindre à cet agronome un spécialiste de la défense des végétaux qui contrôlera les maladies et parasites du matériel importé.

Les centres régionaux auraient à faire face à de grosses responsabilités et le travail à assumer serait considérable. Dans ces conditions, certains d'entre eux ne pourraient accepter d'entreprendre ce travail sans une aide substantielle. Cette aide pourrait faire l'objet d'une demande d'assistance technique adressée à la FAO, à des fondations ou à des groupes intéressés par ce programme d'introduction. Si le programme devient important, l'aide du Fonds Spécial des Nations Unies pourrait être sollicitée par certains pays pour l'achat de l'équipement nécessaire à la récolte, au traitement et au séchage des grains, de l'équipement électrique, des fournitures pour l'emballage, ainsi que pour l'assistance technique de botanistes et écologistes spécialisés dans l'exploration, d'agronomes-expérimentateurs pour l'observation et la multiplication des plantes, et de spécialistes de la défense des végétaux.

Pour assurer et organiser une campagne d'introduction et d'échange de plantes entre les pays appartenant à la zone tropicale, la FAO pourrait dès maintenant réunir à l'échelle mondiale les renseignements utilisables fournis par les différents pays sur ce sujet et les publier, ainsi que l'Index Seminum de certains centres, dans son "Plant Introduction Newsletter". La FAO pourrait publier au fur et à mesure de leur disponibilité les renseignements communiqués par chacun des principaux centres d'introduction des plantes sur les caractéristiques du milieu qui les entoure (climat, sol, végétation naturelle, topographie) les études expérimentales déjà faites et les résultats pratiques obtenus avec d'importantes espèces introduites. La FAO serait également à même d'aider les pays le sollicitant en organisant des réunions et des groupes de travail pour chacun des continents et, en même temps, de fonctionner comme bureau de liaison en coordonnant les échanges entre les divers continents lorsque ces réunions sont rendues difficiles par suite des distances séparant les pays tropicaux.

Il serait utile que la Sous-Division de la Production végétale et de l'Amélioration des Plantes de la FAO connaisse l'opinion des agronomes, botanistes et généticistes sur les propositions présentées dans cette note, afin de pouvoir se baser sur ces commentaires et suggestions pour établir un programme de travail dans ce domaine si important pour tous les pays de la zone tropicale.

99. The Introduction and Exchange of Plant Material between Countries of the Inter-tropical Zone

Guy Perrin de Brichambaut
Crop Production and Improvement Branch, FAO,
Rome

At the Tenth Session of the FAO Conference, member countries have expressed in strong terms their wish that the campaign for the introduction and exchange of plant material already initiated by FAO should be extended as widely as possible. Up to the present time, the Crop Production and Improvement Branch has organized the systematic exchange and experimentation of cultivated varieties in uniform nurseries in the Mediterranean Region, while for other regions it has served as liaison between research organizations from which seeds can be obtained or purchased, and the specialists requesting the seed. FAO has orientated introduction projects in different countries and passed on information to specialists, either directly or by means of the Plant Introduction Newsletter. Several articles, notes and studies (See FAO agricultural Study No. 41: "Plant Exploration Collection and Introduction") have thrown into relief the importance of plant introduction for the improvement of agricultural production.

The countries situated between the tropics and enjoying a hot tropical climate have already taken advantage of the exchange of plants. In spite of the tremendous distances between the continents, migrations of men and commercial exchanges have favoured the introduction and extension of certain crops and weeds, either on purpose or unknowingly in baggage packs, foods, etc. Some species of great economic interest have been collected and introduced in countries where they do not naturally occur: coffee, cacao, cassava, rubber, pineapple, different forage species, now cultivated in the tropical zone of 3 or 4 continents, but originating in only one of them. However, introduced species have often been multiplied from very few samples of seed or limited amounts of vegetative material (e.g. Digitaria decumbens, species of Panicum and Pennisetum); wild forms of cultivated tropical varieties have seldom been systematically collected in spite of their great potential value for the geneticist. The diversity of the tropical flora in the different continents and the economic importance of species introduced in the past indicate the possibility of enlarging greatly these exchanges for the benefit of the tropical countries.

The methods adopted in the Mediterranean and temperate countries for the introduction of new species are not always applicable in the tropical region, because a common type of reproduction is vegetative for many tropical species, the multiplication of clones is often necessary for selected forms and species, the seed production is often very low and its preservation difficult. The transportation of vegetative material obviously poses considerable problems: transportation should be rapid in order to preserve the plants; the samples are voluminous and heavy owing to their high water content. Air transport is almost always necessary, and its high costs limit the amount sent. On the other hand, pests and diseases may be introduced together with the samples, and a very strictly controlled period of quarantine is necessary before the material can be distributed. Seed despatch is often difficult on account of the humidity,

and packages of seeds must sometimes be artificially dried to prevent the heating of the samples and the loss of the germinating capacity. Finally, the activity of botanists in the tropical zones, as elsewhere, brings about the creation of new names for species already known, and results in confusion for the countries introducing species from other continents. Each variety should, therefore, be maintained in a living collection, established by the distributing country, and bear a reference label which will remain unchanged whatever the successive names of the plant may be.

In the tropical zone, a campaign for the exchange of plant material between the continents would have to be particularly well organized to have the greatest effect. Plant exploration and introduction should be centralized in certain centres to facilitate the task of observation and multiplication and to give the necessary taxonomic, genetic and phytosanitary guarantees. Actually, it would be advisable to select a few regional centres, those most characteristic of the main ecological regions. Four to five centres in each continent should be sufficient during the initial period. Of course, within the main region each regional centre could work in association with a certain number of national centres which would multiply the local or imported material and supply indigenous material collected in the environment where they are located.

Each regional centre should be equipped to maintain a living collection of indigenous material, to multiply the more important species which are of interest to specialists elsewhere, to send seeds or plants to other regional centres and, on the other hand, to grow the species coming from other continents, to assure phytosanitary control during the period of quarantine, to multiply and carry out experiments with imported material, and then to distribute this material within the region. It is probable that during the first years the work of the centre should be limited to the exchange of species belonging to a particular group of economic plants (e.g. cover crops, forage plants, indigenous varieties) in order to give the centres enough time to become organized and to make as complete a collection as possible for each selected group.

For all these operations, it would be necessary to appoint at each regional centre a technician responsible for the programme of introduction and multiplication. This technician should have at his disposal sufficient staff including deputy, foremen, workers, and enough land on which to establish the experimental plants and to undertake the multiplication work. In many cases, a plant protection specialist should work closely with the agronomist to observe the development of the diseases and to control them.

The regional centres would have a heavy responsibility, and the workload which they should assume is great. In these conditions some of them could not accept this work without substantial assistance. This help could be requested in the form of an application to FAO for Technical Assistance, or to Foundations or groups interested in this type of introduction programme. If a large programme is to be developed, the UN Special Fund might be approached for assistance in the purchase of equipment for the harvesting, treatment, drying of grains, electrical equipment, packing materials, as well as for technical assistance of botanists and ecologists specialized in the exploration of vegetation, experimental agronomists for the observation and multiplication of species, and specialists in plant diseases.

As an initial step in ascertaining and organizing a campaign of introduction and exchange of plant material between countries of the entire tropical zone, FAO could collect on a worldwide basis the information available on these activities in the different countries and publish them jointly with the Index Seminum of some selected stations in its "Plant Introduction Newsletter". FAO could publish when available the information provided by each of the main introduction stations on their ecological characteristics (including climate, soil, natural vegetation, topographic conditions), the experimental work already carried out and the practical results obtained with important introduced species. FAO may also be able to give direct assistance to the countries requesting its help in the organization of working groups and meetings within continents, and may be able to act as the liaison office for the inter-continental exchanges of material when meetings cannot be organized because of the great distances separating tropical countries.

The Crop Production and Improvement Branch of FAO would be interested to receive the views of the agronomists, botanists and geneticists on the propositions in this Note, and would use the comments and suggestions given in building up a programme of work in a field which is of great importance for all countries of the zone.

100. Improvement of Species and Cultivars of Grain Legumes in Africa*

R. O. Whyte
Chief
Crop Production and Improvement Branch, FAO, Rome

The action which the plant breeder and crop improver should take with respect to the provision of improved species and varieties is a matter for discussion. Do the types already introduced into cultivation, even if in a relatively primitive way, provide a basis for a varietal improvement program involving simple selection or crossing or is it necessary to introduce into breeding programs wild or primitively cultivated species and varieties from other parts of Africa or from other parts of the world ?

To begin at the beginning, it would be necessary to consider and review the significance of certain fundamental aspects, such as the origin of the family of Leguminosae and its component subfamilies and tribes. In the paper presenting his views on the origins of the relations between legumes and their rhizobial bacteria, Norris (1956) deals incidentally with the origin and distribution of the family Leguminosae, reviewing in particular the earlier works of Gundersen, Andrews, Bews, Taubert and others (refs. from Norris).

It appears that the Leguminosae had their origin in upper Cretaceous times when "with a tremendous upsurge the Angiosperms came to dominate the earth's flora, and many modern dicotyledonous families became well established." From the beginning of the Cretaceous until the end of the Tertiary, the vegetation of a large part of the earth enjoyed conditions similar to those of the tropical rain forest of today. When this climate became replaced by the marked division of the present world climate into zones, the Mimosoideae and Caesalpinioideae did not adapt themselves to the change and remained confined to the tropics and subtropics. The third great subfamily, the Papilionatae, responded to changed conditions with great vitality; in this subfamily the greater number of species are found in temperate regions, but the greater number of genera are tropical.

And, with the current interest in tropical legumes for pasture and fodder use and in the rhizobial relationships of tropical and other legumes, what do we really know of the broad botanical relationships and geographical distribution of the Leguminosae ? Norris (1959) has said that it is unfortunately true that agronomists have only the vaguest ideas. "I have met several people who have dismissed tropical legumes quite lightly as of little consequence because there are not many of them, or because they do not nodulate, or because if they do nodulate they fix very little nitrogen. What these people are really doing is admitting to a grievous state of ignorance. This situation is brought about, to a considerable extent, because there is no publication to which one can turn to gain a comprehensive picture of the Leguminosae. An outline of the relationships of the legumes has now been provided by Professor Tutin of the University of Leicester to fill the needs of the Fifth Easter School at the University

* One of the Chapters from an FAO publication on "Grain Legumes in Agriculture and Human Nutrition in Africa", at present in preparation.

of Nottingham (Tutin, 1958), but it is probably still safe to say that there is today no single man who can give an authoritative statement on the number of valid species, or even genera in Leguminosae. There has been no comprehensive revision of the Order since Taubert's monograph in 1894. This is one of the greatest deficiencies in the equipment of the modern agriculturist struggling to raise world food production, and one on which I think action should be taken at the international level.

"However if we make use of what we have and study Taubert to get an approximate picture of the distribution of present-day Leguminosae, it is soon evident that the tropics are the real home of the legumes. Of the three great sub-divisions, two, Caesalpiniacea and Mimosaceae, are almost entirely confined to the warmer regions of the earth with the notable exceptions of Cercis, Gleditschia and Ceratonia in the former, and Acacia in the latter. The third, Papilionaceae, provides the bulk of temperate species." The reasons for this distribution have been noted above and have been dealt with by Andrews (1914) in his analysis of the origins of the Leguminosae.

In initiating work on grain legume improvement in Africa, it would, according to Bunting (1959) be desirable to collect and study plants from the wild or from primitive cultivated conditions, particularly from regions of ecological diversity. Following the modern taxonomic study required by Norris, a Vavilovian study of homologous variations should be most valuable, especially if supplemented by studies of breeding systems and the like.

It would be desirable to facilitate work in Africa on the assessment of present resources, the assembly of new material of wild or primitive cultivated forms, and their use in varietal improvement programs by organizing a system of collaboration between research centres in the region. The technical staff would review the origin of all varieties at present used in cultivation, and have for this purpose a good basis in the FAO Tabulated List of varieties of tropical and subtropical grain legumes (1959). They would consider whether the existing crop varieties originated from the wild flora of Africa or were introduced from other parts of the world. They would review the results likely to be achieved by further introductions, would consider the extent of genetic adaptation in homologous environments, and the degree to which primitive peoples may have selected, intentionally or otherwise, large seeded forms from predominantely small seeded wild species. It would be desirable to list all the living collections of grain legume species and varieties maintained by specialists in Africa, as has been done in a preliminary way in FAO Plant Introduction Newsletter No. 6. Further steps should be taken to expand these collections and make them available on an exchange basis to other specialists in the region. On the basis of such cooperative observations, it would be possible to decide whether it will be necessary to undertake new and expensive plant exploration or collection, or whether the existing cultivated varieties have a sufficiently broad genetical base to provide the material for crop improvement.

In parenthesis at this point, attention must be drawn to the possibility that it may be necessary, if not essential, to collect nodules at the same time as one is collecting new material from the wild, or transferring plants from one environment to another in which they have not hitherto been cultivated. When there was less awareness of the importance of nodule bacteria in nitrogen fixation and of the restricted specific nature of the symbiosis in many species, little thought was given to the need for introducing the appropriate nodule bacteria when exotic legumes were introduced into the newer countries. In some cases the new legumes probably were nodulated effectively by strains of indigenous nodule bacteria (e.g. cowpeas and groundnuts) or by strains already introduced by chance and then occurring naturally in horticultural soils in and about the more closely settled areas (e.g. peas and beans). In a few cases it seems likely that chance introduction of effective nodule bacteria occurred with the planned or inadvertent carriage of pods or seeds of the legumes (e.g. medicks and clovers). It is apparent, however, that many introduced legumes have failed under test in the past, at least partly because in their new environment they lacked a suitable strain of effective nodule bacteria. It would furthermore seem essential that experiments should be carried out to assess the effectiveness (effectiveness in fixation as distinct from actual nodule production) of strains symbiotic with newly developed crosses in a crop improvement program (MacConnell, 1960).

It has been found by considerable experience that significant numbers of nodule bacteria survive in legume nodules when the nodules are collected in a fresh state and are dried quickly and completely without heating. Furthermore, they remain viable for several months if they are kept relatively cool and in a desiccated state. The technique adopted by the Division of Plant Industry, C.S.I.R.O., Canberra, Australia, involving the use of specially designed polythene tubes, is described by Whyte (1958).

In crop improvement, it is frequently essential to decide whether to produce varieties adapted to the existing conditions, or to produce markedly superior varieties which cannot express their full potentialities until there have been considerable advances in agronomic methods. This is no less the case with grain legumes in Africa. Varietal improvements have so far been made by introduction and by selection from indigenous, primitive cultivated populations. In most cases it is necessary first to have observation plots, in order to compare and assess varietal differences in response to nutrients, growth habits, effects of spacing and other characters of importance to both the breeder and the agronomist.

In the early stages of crop improvement programs, the breeder observes his material and applies the method of selection in the first instance, perhaps using crosses to study breeding systems. Later when more selection has been exhausted and has produced the maximum possible results, crossing programs may be needed to transfer specific characters, such as genes for disease resistance. In certain cases, diseases occur which are difficult to control by cultural practices, although

low-yielding varieties are available and can be used as parental material (for example, the work on leaf spot and rosette disease in groundnuts in progress at Yangambi, Belgian Congo, Bambey, Senegal, and elsewhere).

When testing improved varieties, it is necessary to realize that they are likely to do appreciably better than the previous standard when they are grown in conditions which permit them to express their full potentialities. In much of Northern Rhodesia, for example, improved varieties do little better than local strains in conditions of low soil fertility (Smartt, 1959). The encouragement of highly productive strains in areas of low soil fertility is not to be recommended where this might hasten the progress of soil impoverishment.

Another point connected with soil fertility should be borne in mind, namely, the effects of nutrient reserves in seeds of large seeded legumes in relation to susceptibility to an immunity from deficiencies of trace elements. Hewitt (1958) has shown this in relation to the responses of beans and peas to molybdenum in pot cultures and field tests. In some areas of Africa, it is quite possible that there may be partial deficiencies of some of the trace elements, notably copper, zinc and molybdenum, capable of affecting the performance of legumes (Webb, 1959). It is known that the seed of many legumes, particularly those with large seeds, may carry a sufficient supply of these elements to permit two or more generations to grow and fructify, even under conditions of severe deficiency in the supply of the elements. It seems possible, therefore, that new introductions of seed from an area where the species thrives may carry a supply of one or more of the trace elements sufficient to mask a soil deficiency for several years. The performance of the introduced species might then be initially very good, but deteriorate over a period of years as the original "stock" of nutrient in the seed was exhausted. The final state of equilibrium might even be worse than that of local legumes which had already reached an equilibrium with their environment. One difficulty encountered in Gambia might have been due to this. Seed of Crotalaria (juncea?) was harvested from roadsides and uncultivated land and had very good germination. This seed was used successfully on experimental plots in green manuring trials, but the seed harvested from these plots, that is, from land which had been under cultivation for many years failed almost completely to germinate. Grown on land which had not been cropped so extensively the seed was quite satisfactory. These relatively small seeds might be expected to show up defects earlier than would larger seeds.

In any work on the improvement of varieties of grain legumes, care must be taken to ensure that the botanical or agronomic improvement has not been accompanied by a deterioration in the value of the product in human nutrition, due to a change in amino-acid content or other important characters. Breeders should therefore work in association with recognized centres for nutritional research so that the quality of the grains they have made available by selection or hybridization may be analysed and checked by competent specialists.

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101. FAO: Crop Production and Improvement Branch - Activities in seed exchange November 1959/February 1960

Country and Date of Receipt of Requests	Seed Requested	Date dealt with and Remarks
NIGERIA Mr. M.A. Akintomide Ministry of Agriculture Abadan 1/11/59	Seed of varieties of castor (Ricinus communis for trial)	18/11/59 Seed of castor varieties received from USA and dispatched. Awaiting seed of varieties from India.
+ SUDAN Mr. Baumer Kordofan 4/11/59	Forage seed. Ecotypes of following species as many as possible: * Andropogon gayanus * Cenchrus ciliaris * Cenchrus setigerus Beckeropsis uniseta Bothriochloa insculpta Bouteloua eriopoda Brachiaria dictyoneura Buchloë dactyloides Cortaderia selloana Cynodon plectostachyus Digitaria herpoclados Digitaria pentzii Oryzopsis hymenoides Saccharum spontaneum Sorghum almum * Sorghum sudanense	15/11/59 To date have received seed of Oryzopsis hymenoides, Sorghum almum and Agropyron desertorum from Cyprus and Cenchrus ciliaris and C. setigerus expected from Australia.
BURMA State Agricultural Marketing Board Rangoon 13/11/59	Rice seed (Oryza sativa L.) Varieties from Spain: Arborio Razza 77 Balilla	2/12/58 Private transaction. Seed not passing through FAO.
MADAGASCAR Mr. Fournier Paris 8/12/59	Forage seed of following species: Sorghum sudanense Pennisetum typhoideum Sorghum almum Trifolium alexandrinum	18/12/58 Seed obtained and sent from FAO Headquarters.

(For those marked with an asterisk, the enquirer would like brief information on site of harvest, time of harvest, type of climate and soil)

Country and Date of Receipt of Requests	Seed Requested	Date dealt with and Remarks
SYRIA Mr. R. Jaber Cotton Bureau Damascus 10/12/59	Cotton seed. Following varieties from: USA Rex — Acala 442 Acala 1517 C — Lankart 57 Deltapine 15 — Coker 100 staple Northern Star — Pima S.1 Russia (U.S.S.R.) 108 F — 1298 137 F — 5476 i 138 F Uganda B.54 S.47 and derivatives Albar (experimental)	17/12/59 To date have received seed from USSR. Seed expected from USA and Uganda shortly.
ITALY Mr. C. Tagliabue Milan 10/12/59	Flower seed (Nelumbium speciosum)	15/12/59 Seed obtained and dispatched from Egypt.
SWITZERLAND Mr. S. Badoux Lausanne 15/12/59	Forage seed (Onobrychis sativa) from Middle East	16/12/59 Seed being collected in Iraq and Iran.
ISRAEL Mr. D. Atsmon The Weizmann Institute of Science, Rehovoth 18/12/59	Wheat (Triticum sativum) Endogenous wheat varieties from Turkey and Iran	13/1/60 Seed obtained and dispatched direct from Iran and Turkey to Israel.
EGYPT (U.A.R.) Mr. Abdullah Ministry of Agriculture Cairo 31/12/59	Rice Seed (Oryza sativa) List of 154 Japanese varieties extracted from "World Catalogue of Genetic Stocks", FAO, Rome	15/1/60 Still awaiting seed from Japan
SENEGAL Mr. J. Dubois Saint-Louis 4/1/60	Information on availability of seed of forage species suitable for the dry season in a region with an annual rainfall of 300-400 mm. and two different soil types: soils of sand dunes not subject to flooding and alluvial soils often with a high-clay content and saline and subject to flooding	16/1/60 Recommended: Chloris gayana Cynodon plectostachyus Panicum coloratum for sand dune soils and Cenchrus ciliaris Panicum antidotale Pennisetum orientale for soils subject to flooding. Advised seed obtainable in Southern Rhodesia and S. Africa.

Country and Date of Receipt of Requests	Seed Requested	Date dealt with and Remarks
+ INDIA Dr. B.W.X. Ponnich Agricultural College and Research Institute Coimbatore 13/1/60	Seed required of the following: (a) Virus free cacao of N. African hybrids. (b) Stipo sorghum from Australia. (c) As much as possible of the Afghanistan collection (see Plant Introduction Newsletter) No. 4, item 78) (d) Rice seed (*Oryza* spp.) Africa — *O. perennis* " — *O. breviligulata* " — *O. brachyantha* Burma — *O. minuta* China — *O. meyeriana* Japan — *O. granulata* Tr. Africa — *O. officinalis* " — *O. eichengeri* Mediterranean countries — *O. subulata* *O. alta*	18/1/60 To date virus free cacao has been sent direct from Belgian Congo and a certain amount of the Afghanistan collection.
	Seeds of wild species of *Gossypium*: *G. sturtii* *G. robinsonii* *G. harknersii* *G. lobatum* *G. trilobum* *G. triphyllum* *G. somolense* *G. areysianum* *G. longisalyx* *G. incanum* *G. tomentosum* Races of *G. hirsutum*: *G. hirsutum* race *yucatanense* *G. hirsutum* race *morilli* *G. hirsutum* race *richmondii* *G. hirsutum* race *palmerii* *G. barbadeum* race *brasiliense*	15/1/60 Awaiting seed from Texas Agric. Expt. Sta. USA
	Seeds of *Arachis* spp.: *A. tuberosa* *A. villosulicarpa* *A. diogoi* *A. helodes* *A. marginata*	15/1/60 Seed requested from Brazil and North Carolina, USA. Not available at present.

Country and Date of Receipt of Requests	Seed Requested	Date dealt with and Remarks
AFGHANISTAN Mr. J. del Perugia Kabul 13/1/60	Seed of Salsola vermiculata for desert region of Kandahar from Syria	28/1/60 Availability of seed being ascertained in Syria.
+ EAST PAKISTAN Mr. Kung 15/1/60	Seed of following crops required: Wheat (Triticum sativum) Maize (Zea mays) Soya bean (Glycine max) Groundnuts (Arachis spp.) Mustard (Brassica spp.) Interested in material from similar ecological zones in the world. Requirements for crops are growing period 120-140 days, will be grown in winter season Dec.-Apr. Location 25°N of equator. Av. temp. Dec. is 75°F rising to 90°F in April. Soil fairly fertile. Ganges alluvium varies sandy to clayey. Varieties must be suitable for small holdings without mechanisation. Amount of seed required for each crop enough to sow a plot 25 m2.	20/1/60 Letters sent to Queensland, Mexico and Brazil. So far seed of several wheat varieties has been received from Mexico.
+ U.S.A. Mr. H.L. Hyland Beltsville 20/1/60	Forage seed of ecotypes of Alopecurus pratensis and A. arundinaceus indigenous to Europe, Asia and Mediterranean	29/1/60 To date some seed of A. pratensis received from U.K. and some expected from Italy.
FRANCE Mr. P. Hughes Montpellier 27/1/60	Forage seed. Ecotypes of Bromus inermis from Central Europe, Israel and Australia	1/2/60 Bromus inermis samples sent from Headquarters; 2 from Spain; 1 from Portugal and 3 from USA.
UNITED KINGDOM Mr. I.V. Hunt West of Scotland Agr. College, Ayr. 2/2/60	Forage seed. Ecotypes of Tall Fescue (Festuca elatior) from Mediterranean and Europe	11/2/60 Seed of Festuca elatior from Cyprus. Festuca elatior var. arundinacea from USA and Portugal and Festuca elatior var. pratensis from USA sent from FAO Headquarters, Rome.

Country and Date of Receipt of Requests	Seed Requested	Date dealt with and Remarks
EGYPT - U.A.R. Mr. G.J. Piquer Cairo FAO Regional Horticulturist 3/2/60	Seed of the medicinal plant Duboisia myropioides from Australia	15/2/60 Awaiting seed from Australia
+ UNITED KINGDOM Mr. A.R. Beddows Welsh Plant Breeding Station, Aberystwyth 3/2/60	Seed samples of Holcus lanatus from North Africa	16/2/60 Awaiting seed from Tunisia
TANGANYIKA Mr. J.C. Macartnoy Arusha 4/2/60	Seed of varieties of Phaseolus vulgaris suitable for canning and resistant to rust (Uromyces appendiculatus). Crop is to be grown between 3000 and 6000 ft. with mean annual rainfall of 25-40" on soils varying from grey or black volcanic ash to rod granite plains soils more or less alkaline and with wide range of textures and fertility	15/2/60 List of contact addresses given in S. America and USA extracted from Plant Introduction Newsletter No. 6, FAO, Rome
ITALY Dr. C. Antoniani 6/2/60	Seed of Lucerne (Medicago sativa) variety Stam from Sweden	8/2/60 Awaiting seed from Svalöf, Sweden
EGYPT - U.A.R. Mr. G.J. Piquer Regional Horticulturist Cairo 10/2/60	Seed of a red sweet onion variety (Allium cepa) from Italy and some seed samples of tomato varieties (Lycopersican esculentum), fusarium resistant and suitable for canning, also from Italy	15/2/60 Awaiting seed from N.Italy
UNITED KINGDOM Dr. I. Isaac University of College Swansea, Wales. 10/2/60	Seed of Sulla (Hedysarum coronarium)	12/2/60 Seed sent from Headquarters FAO, Rome
SPAIN Dr. G.G. Martin Madrid 26/2/60	Seed of the genera Phalaris for genetic studies	29/2/60 Seed of P. tuberosa, P. minor, P. paradoxa, P. brachystachis, P. caerulescens, P. truncata sent

All enquiries relating to seed should be addressed to Mr. M.D. Kornick, Crop Production and Improvement Branch, FAO, Rome, who would also be particularly interested to receive seed samples of tho species mentioned in the seed requests marked "+".

102. FAO: Recent publication

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It is hoped to convene the Technical Meeting on Plant Exploration and Introduction in July 1961. Correspondence would be welcome with regard to the preparation of the agenda for this meeting.

104. FAO: List of National Plant Quarantine Services

An up-to-date list of national plant quarantine services was issued by Crop Protection Branch in January 1960, and a copy is being circulated with this Newsletter.

105. United Kingdom: Application of immunological methods in taxonomic studies

"The application of immunological analysis to plant taxonomy has been made practicable by the development of gel-diffusion methods, both by the Elek-Ouchterlony technique and by the more recent immuno-electrophoretic technique of Grabar and Williams. By these means individual proteins in plant extracts may be differentiated and a number of components in the extracts compared individually with those from related species. A modification of these methods has been applied to the investigation of the genus Solanum, with particular reference to the inter-relationships of certain Mexican species of potato with one another and with S. tuberosum, the domestic potato.

"Antisera were raised in rabbits to crude saps from S. tuberosum and S. ehrenbergii (a Mexican species), using a combination of Freund's adjuvant technique with courses of intravenous injections. With both antisera well-marked precipitation lines developed against extracts from all the thirty-eight species examined; and by comparison of the direct 'line-spectra' and those obtained after cross-absorption of an antiserum, it was possible to divide the species into groups. The results show in their main outline a remarkably close agreement with those obtained from the classical taxonomic methods, and with the general conclusions arrived at from cytological and genetical studies.

"The value and the limitations of these immunological techniques as applied to taxonomic studies are discussed."

(Summary of:
GELL, P.G.H., HAWKES, J.G. and WRIGHT, S.T.C. 1960. The application of immunological methods to the taxonomy of species within the genus Solanum. Proceedings of the Royal Society, B, Vol.151, pp.364-383)

106. United Kingdom: Royal Botanic Gardens, Kew, Surrey

Dr. Keith Jones, B.Sc., Ph.D., of the Welsh Plant Breeding Station, has been appointed a Principal Scientific Officer at the Royal Botanic Gardens, Kew, to undertake research in cytogenetics (the study of the mechanism of heredity). Dr. Jones will take up his duties at Kew on 2 May 1960.

Over the past 100 years Kew has established an international reputation second to none for its scientific work on the naming, description and classification of plants and on economic botany. In the course of this work an unrivalled collection of living plants has been built up - there are some 45,000 different species and varieties of plants growing in the gardens. These provide opportunities hardly to be equalled anywhere else in the world for expanding the scope of botanical research. The appointment of Dr. Jones to undertake research in cytogenetics is a first step in the exploitation of the scientific potential of the living Kew collections in directions not wholly concerned with plant taxonomy and economy botany.

Since 1948 Dr. Keith Jones has been Senior Scientific Officer in charge of cytology at the Welsh Plant Breeding Station, University College of Wales, Aberystwyth. From October, 1958, to October, 1959, Dr. Keith Jones was a post-doctorate Fellow of the National Research Council of Canada, studying at the Plant Research Institute, Canadian Department of Agriculture, Ottawa.

107. United Kingdom: Scottish Plant Breeding Station

Mr. I.H. McNaughton has started a programme of research on the genus Brassica with a view to producing a new fodder plant. He is anxious to obtain seed of wild brassicas and in particular B. oleracea and B. campestris forms. India and Japan appear to be good sources, especially for types belonging to the B. campestris group. Cultivated brassicas from these countries might also be useful.

He would be very grateful to establish contact with any plant collectors, seedsmen, etc. who might be able to help him with material. The address is: Scottish Plant Breeding Station, Pentlandfield, Roslin, Midlothian, Scotland.

108. France: Centre technique d'Agriculture tropicale - Liste des plantes récoltées en 1959

(S = Semences; B = Boutures; E = Eclats de souches, rhizomes ou bulbes)

Abutilon avicennae Gaertn.	S	Inula ensifolia L.	S
Agrostemma githago L.	S	I. graveolens Desf.	S
Alyssum saxatile L.	S	I. helenium L.	S
Anaphalis margaritacea		I. macrophylla	S
Benth. et Hook. f.	S	I. oculus christi L.	S
Arachis hypogea	S	I. royleana D C.	S
Asclepias incarnata L.	S,B	I. thapsoides	S
Baeria chrystostoma Fich. et Mey	S	Ipomea rubro-coerulea Hook.	S
Bromus schraederi Kunth.	S	I. purpurea var. flore pleno	S
Carthamus tinctorius L.	S	Laportea canadensis (L.) Gaud.	E
Carum carvi L.	S	Lespedeza bicolor Turz.	S
Catalpa bignonioides Walt.	S	Medicago lupulina L.	S
Coix lacryma Jobi L.	S	M. sativa L.	S
Coriandrium sativum L.	S	Melilotus altissima Thuill.	S
Cyperus esculentus L.	E	Nicandra physaloides Gaertn.	S
Cyphomandra betacea	S	Ocimum basilicum var. album	S
Datura stramonium L.	S	Origanum vulgare L.	S
Dioscorea sp.	S	Papaver somniferum L.	S
Eleusine aegyptica	S	Phacaelia tanacaetifolia Benth.	S
E. trystachia Kunth.	S	Phaseolus multiflorus Wild.	S
Galega officinalis L.	S	Paliurus aculeatus Lam.	S
Helianthus annuus L.	S	Salvia officinalis L.	S,E
Hordeum jubatum L.	S	Spilanthes acmella Murr.	S
Inula bifrons L.	S	Tunica prolifera Scop.	S
I. britannica L.	S	Vincetoxicum officinale Moensch.	S,E

En plus, la liste indique que des semences des 67 variétés de soja suivantes ont été récoltées:-

Bicolores

Bi I Mandarin Canada

Brunes

B4 Starackraniskaya
B5 Grignon 18
B8 Early Brown
B14 Grignon 3
B18 (no.2) var. ochroleuca Hort.

Jaunes

J1 Kamianetz
J2 Woka
J3 SS
J4 Mandchourie
J5 Tulowka
J6 Bitterhof
J7 Zelena Ech.
J8 Kouban 0,375
J9 Dieckmanns Helgelb
J10 " Frühegelb
J11 Grignon 14
J12 Hatto jaune
J13 Jaune de Desme
J14 Washington Mandarin
J16 Mandarin Roudnice
J17 " Yowa
J18 Hispida grain jaune uni
J19 Reoz 20 bis
J20 Grignon 5 14/9
J21 Dippe Frühegelb 14/9
J22 Stamm 108 Mabelfortsetz 84
J23 Giessner Stamm 63
J24 Rouest 71 19/9
J25 Grignon 45
J26 Rouest 104
J27 Grignon 41
J28 Grignon 21
J29 Rouest 29

Jaunes (suite)

J31 Tokio jaune oeil brun
J32 Précoce de Milly
J35 Diekmanns grüngelbe
J37 Mandchu Hidson
J38 Ried 528
J42 Scheoken
J43 Ta ching mi Hwang, Ton Tse
J45 Dans. Desmarais
J46 Vicuson
J47 Ito San
J48 bis Rouest 82 jaune lat
J50 Hispida à grain jaune
J51 American yellow
J52 Washington 37.563
J53 Harrow Mandchu
J55 Brown very small
J58 Jaune de Mandchourie
J60 Kleverhof 527
J61 Dunfield Soy Bean
J62 Soja 2
J63 Dr Brillmeyer Hort.
J64 Semilutea Hort.
J65 Mediascher Braune
J66 Elite Hort.
J68 Ried 550
J69 Garola Rouest
J70 Halton 502-2
J71 Bitterhof's gelbfruhe
J72 Rouest 250

Noires

N20 Tokio noir
N24 Rouest 117
N25 var. nigra Hort.

Vertes

V2 Géant vert.

109. Germany: German Botanical Agricultural Expedition to the Andes January/August 1959

The report of this expedition, which comprised the second gene centre expedition to South America of the Max-Planck-Instituts für Züchtungsforschung, and the cytological-geographical expedition of the Botanischen Instituts der Universität, Köln, contains the following items:-

(i) W. Rudorf: Über die Aufgabe und Vorbereitung der Expedition. (Objectives of and preparations for the expedition)
(ii) H. Ross und R. Rimpau: Beschreibung des Expeditionsverlaufes. (Description of the expedition).

(iii) H. Ross und R. Rimpau: Itinerar.
(Itinerary)

(iv) L. Diers: Itinerar und kurzer Bericht.
(Itinerary and short report)

(v) Aufstellung des gesamten von Dozent Dr. H. Ross und Dr. R. Rimpau gesammelten Materials.
(Lists of all material collected by Dr. H. Ross and Dr. R. Rimpau)

The following is a summary of the collections made by Dr. Hans Ross and Dr. Rudolf Rimpau:-

	No. of collections		No. of collections
Solanum, wild sp.	282	Barley	14
Solanum, cultivated sp. except S. andigena	39	Rye	8
S. andigena	470	Oats	1
Phaseolus, wild sp.	48	Grasses	8
Phaseolus and related genera, and cultivated sp. apart from Ph. vulgaris	29	Lucerne	3
Ph. vulgaris	150	Peas	4
Lupinus, wild sp.	64	Chickpeas	2
Lycopersicum, wild sp.	22	Vicia faba	11
Capsicum, cultivated forms	30	Rape	2
Maize, cultivated forms	56	Berry and tree fruits	11
Wheat (Triticum aestivum)	6	Miscellaneous S.American cultivated plants	11
" (T. dicoccum)	1	Ornamental plants and material for investigations into chromosome geography	187
" (T. durum)	2	Orchids	40

Total number of collections: 1501

110. Germany: Institut für Pflanzenzüchtung Gross-Lüsewitz

Dr. Rothacker informed us in June 1959 that he planned to collect potatoes in northern Argentina from the winter of 1959 to spring 1960. A report will be provided in due course. Dr. Rothacker states that he is at present engaged on an intensive study of the collections made in 1958 by Professor Brücher (Mendoza, Argentina) and Dr. P.M. Zhukovski (Leningrad) for types resistant to Heterodera rostochiensis, Actinomyces scabies, Phytophthora infestans and several viruses. The Institute at Gross-Lüsewitz maintains a collection of about 1,500 wild, primitive and cultivated species and is willing to provide specialists with material from the pure species as well as from hybrids.

111. Poland: Programme for seed exchange

One of the international activities planned by the National FAO Committee within the scope of the World Seed Campaign is an expanded program for mutual seed exchange with interested countries throughout the world, with the aim of exchanging seed samples of Polish varieties for improved varieties from foreign countries, to be tested under local conditions. For this reason, the Sub-Committee, especially appointed for this action, has submitted to FAO:

(a) Index Seminum 1957/58 - a printed and illustrated list of species, varieties and strains of all kinds of agricultural crops of which seed is available for international exchange, completed and published by the Institute for Plant Breeding and Plant Introduction at Bydgoszcs. The 1959 edition of this Index is already in preparation, and it will be published in due course.

(b) Delectus Seminum 1957/58 - a similar list of species, varieties and strains of some agricultural crops, horticultural crops, flowers, ornamental shrubs, fruit and other trees, issued by the Botanical Garden of the Institute mentioned under (a). In an appendix, a list is given of all the institutions and agencies throughout the world with which this Botanical Garden has already established regular seed exchange.

(c) A list of varieties and strains of specific field crops of which the Polish authorities are interested to receive seed samples for testing and other experimental purposes, in exchange for their own material. This list includes varieties of wheat, barley, oats, sugar beet, peas, lucerne, clovers, lupins, flax, hemp, tobacco, poppy, chicory, and grasses from Austria, Denmark, France, Germany, Greece, Italy, Japan, the Nethorlands, Portugal, Sweden, Switzerland, Turkey, United Kingdom and the United States of America.

The National Seed Campaign Committees and all other authorities, particularly in the countries indicated under (c), who are interested in this Polish program for mutual seed exchange and plant introduction, can obtain free copies of the above-mentioned lists, by sending a request to: Mr. E. Wiszniewski, Secretary of the Polish National FAO Committee, Ministry of Agriculture, Wspolna 30, Warsaw, or to: Mr. J.J. de Jong, Coordinator of the World Seed Campaign, FAO Headquarters, Rome.

Pologne: Programme d'échange de semences

Parmi les activités internationales que le Comité national pour la FAO envisage pour la Campagne mondiale des semences figure un programme élargi d'échanges mutuels de semences avec les pays intéressés: c ce programme sera de portée mondiale et permettra d'échanger des variétés polonaises contre des variétés améliorées étrangères qui seront mises à l'essai dans les conditions locales. Aussi le Sous-comité spécialement constitué pour l'exécution de ce programme a-t-il communiqué à la FAO:

(a) L'Index Seminum 1957/58: publication imprimée et illustrée énumérant les espèces, variétés et souches de toutes les plantes agricoles dont les semences pourraient être échangées internationalement. L'ouvrage a été

réalisé et publié par l'Institut de sélection végétale et d'introduction des plantes de Bydgoszcz. L'édition de 1959, déjà en préparation, paraîtra ultérieurement.

(b) Le Delectus Seminum 1957/58: c'est, publié par le Jardin botanique du même Institut, une liste analogue de certaines espèces agricoles, horticoles et florales et d'arbres ornementaux, fruitiers et autres. Une annexe indique les institutions et services du monde entier avec lesquels le jardin botanique effectue déjà des échanges réguliers de semences.

(c) Une liste des variétés et souches de certaines plantes de grande culture dont les autorités polonaises désireraient recevoir des échantillons de semences pour essais et expérimentation, en échange de leur propre matériel. Y figurent des variétés de blé, orge, avoine, betterave sucrière, pois, luzerne, trèfle, lupin, lin, chanvre, tabac, pavot, chicorée et graminées, originaires des pays suivants: Autriche, Danemark, France, Allemagne, Grèce, Italie, Japon, Pays-Bas, Portugal, Suède, Suisse, Turquie, Royaume-Uni et Etats-Unis d'Amérique.

Les Comités nationaux pour la Campagne des semences et toutes les autres autorités (spécialement dans les pays énumérés au paragraphe (c) ci-dessus) qui s'intéressent au programme polonais d'échanges de semences et d'introduction de végétaux recevront à titre gracieux les listes susmentionées en les demandant à: M. E. Wiszniewski, Secrétaire du Comité national polonais pour la FAO, Ministère de l'Agriculture, Wspolna 30, Varsovie, ou à M. J.J. de Jong, Chargé de la coordination de la Campagne mondiale des semences, FAO, Rome.

Polônia - Programma de intercambio de semillas

Una de las actividades internacionales proyectadas por el Comité Nacional de la FAO dentro del marco de la Campaña Mundial de la Semilla es un programa ampliado de intercambio mutuo de semillas con todos los países que lo deseen cuyo fin es cambiar muestras de semillas de variedades polacas con variedades mejoradas de otros países, a fin de ensayarlas en las condiciones locales. Por esta razón, el Subcomité, nombrado especialmente para esto, ha presentado a la FAO los siguientes documentos:

(a) Index Seminum 1957/58: lista impresa e ilustrada de especies, variedades y razas de todos los tipos de cultivos agrícolas de los cuales se dispone de semillas para intercambio con otros países, completado, y publicado por el Instituto de Mejoramiento e Introducción de Plantas de Bydgoszcz. La edición de 1959 de este Indice se encuentra ya en preparación y aparecerá a su debido tiempo.

(b) Delectus Seminum 1957/58: lista análoga de especies, variedades y razas de algunos cultivos agrícolas, hortícolas, florales, de arbustos ornamentales, de frutales y de otros árboles, publicada por el Jardín Botánico del Instituto antes mencionado. En un apéndice, se presenta una lista de las instituciones y organizaciones de todo el mundo con que este Jardín Botánico ha establecido ya un intercambio regular.

(c) Una lista de variedades y razas de cultivos de campo específico de que las autoridades polacas tienen interés en recibir muestras de semilla para ensayo y para otros fines experimentales, a cambio de material del país. En esta lista figuran variedades de trigo, cebada, avena, remolacha azucarera, guisantes, alfalfa, tréboles, altramuces, lino, cánamo, tabaco, adormidera, achicoria y gramíneas de Austria, Dinamarca, Francia, Alemania, Grecia, Italia, Japón, Países Bajos, Portugal, Suecia, Suiza, Turquía, Reino Unido y Estados Unidos.

Los Comités Nacionales para la Campaña de la Semilla y todas las demás autoridades, particularmente de los países mencionados en (c), que estén interesados por este programa polaco de intercambio mutuo de semillas y de introducción de plantas, podrán obtener gratuitamente ejemplares de las listas antes citadas solicitándolos a: Sr. E.Wiszniewski, Secretario del Comité Nacional Polaco de la FAO, Ministerio de Agricultura, Wspolna 30, Varsovia, o a: Sr.J.J. de Jong, Coordinador para la Campaña Mundial de la Semilla, FAO, Roma.

112. Africa: Forthcoming FAO publication

The following publication will be of great interest and value to all concerned with plant exploration and introduction as related to the grass flora of Africa:

The Grass Cover of Africa, by J.M. Rattray (Agricultural Study No.49). Orders for this publication (expected to be ready for publication in June 1960), should be addressed to local sales agents or to: Chief, Distribution and Sales Section, Publications Service, FAO, Rome (Price: US $2.50 or 12s.6d.)

FAO has for some years been engaged on a project designed to map those grasslands of the world, and particularly of the underdeveloped regions, which have not been mapped by national and other bodies. FAO's main interest has so far been centred on India and the continent of Africa, but already some preliminary thought is being given to Latin America, south of the United States-Mexico border. This mapping has, of course, an important scientific application, since it will provide data and interpretations of great interest to plant ecologists, plant geographers, soil conservationists and others. But its practical application is of even greater significance.

It was soon found that, although most of the countries and territories in Africa had been mapped in one way or another, these many and diverse maps could not be fitted together to produce an overall map of the grass cover. They had been prepared for different purposes (physiognomy of vegetation, forestry, etc.) and in different degrees of detail: the territories had been surveyed by different methods, and the method of presentation of the maps was not sufficiently uniform.

The map of the grass cover of Africa which will be published this year shows in colour the main types of grass cover which have been recognized, based on the characteristic rather than the dominant species in any particular region. Hatchings indicate the occurrence of the grass type in different physiognomic formations - for example, grassland savannah, forest and thicket, woodland, steppe, etc. The accompanying text indicates for each type, in varying degrees of completeness depending on the information available, the associated grass, tree and other species, the altitude, rainfall, soil type, and the present management as grazing land or utilization as crop land.

113. Tunisia: Collections of herbage plants

FAO Field Officer in Tunisia, Mr. M. Thiault, now has available for distribution seeds of Tunisian ecotypes of the following grasses and legumes: Festuca arundinacea, Phalaris truncata, Ph. coerulescens, Hedysarum carnosum, Lotus cytisoïdes, and Dactylis glomerata. Festuca elatior has also been collected from different local populations (especially at Grombalia and Bou Ficha) but these are not necessarily ecotypes. Mr. Thiault thinks that several ecotypes could be isolated in each of these populations, according to their different morphological characters. Requests for seed should be addressed to FAO, Rome, for attention of Crop Production and Improvement Branch.

Seed of Holcus lanatus will be available in May.

114. Kenya: Important grassland plants

In the April 1959 issue of The East African Agricultural Journal the staff of the Grassland Research Station, Department of Agriculture, Kitale, Kenya, published summarized information on the indigenous and exotic species of grasses and legumes of actual or potential value in Kenya, as follows:-

Botanical name	Common name	Approx. Altitude range	Rainfall	Minimum seed rates for pure stands
IMPORTANT CULTIVATED GRASSES WHICH ARE IN COMMERCIAL SUPPLY		Feet	Inches	lb. per acre
Bromus unioloides	Rescue grass	6,500 and over	35 and over	35
Chloris gayana	Rhodes grass	0-8,000	25 and over	1½ (P.G.S.)
Cynodon dactylon	Common star grass	0-8,000	20 and over	Roots
Dactylis glomerata	Cocksfoot	7,000 and over	35 and over	10-20
Festuca elatior	Tall fescue or Kentucky fescue	7,000 and over	30 and over	5-10
Lolium italicum	Italian rye-grass	6,000 and over	35 and over	15-20
Lolium perenne	Perennial rye-grass	8,000 and over	40 and over	15-20
Melinis minutiflora	Molasses grass	5,000-8,000	25 and over	1 (P.G.S.)*
Panicum maximum var. trichoglume	Slender guinea grass	0-7,500	25 and over	½ (P.G.S.)*
Pennisetum purpureum	Elephant grass or Napier grass	0-8,000	25 and over	Roots/stems
Phalaris tuberosa	Canary grass	6,500 and over	30 and over	5-8
Setaria sphacelata	Nandi setaria	5,000-8,000	30 and over	½ (P.G.S.)*
Sorghum almum	Columbus grass	0-8,000	20-35	15
Sorghum sudanense	Sudan grass	0-8,000	20-35	15-20

* P.G.S. = Pure Germinating Seed

114. Kenya: Important grassland plants (continued)

Botanical name	Common name	Approx. Altitude range	Rainfall	Minimum seed rates for pure stands
GRASSES WHICH SHOW CONSIDERABLE PROMISE FOR CULTIVATION		Feet	Inches	lb. per acre
Beckeropsis uniseta	Natal grass or Beck grass	5,000-7,000	35 and over	10
Bothriochloa insculpta	Sweet pitted grass	0-6,000	20-35	30-40 (Partially cleaned heads)
Brachiaria ruziziensis	Prostrate signal grass	3,500-6,500	30 and over	(?) 30
Cenchrus ciliaris	African foxtail or Buffel grass	0-6,000	20-35	10-15 (cleaned)
Cenchrus setigerus	Smooth African foxtail	0-6,000	20-35	10-15 (cleaned)
Cynodon plectostachyus	Naivasha star grass	0-6,000	20-35	5
Eragrostis superba	Masai love-grass	0-6,000	20-35	50 (heads)
Panicum coloratum	Coloured guinea grass, Blue guinea grass, or Keria grass	0-7,500	20 and over	10-15
Panicum maximum	Common guinea grass	0-7,500	20 and over	¼-½ (P.G.S.)*
Paspalum malacophyllum	-	5,000 and over	25 and over	10-15
Paspalum commersonii (= P.scrobiculatum var. commersonii)	Ditch Millet Commer grass, or Scrobic	0-9,000	25 and over	15-20
Poa pratensis	Smooth stalked meadow grass or Kentucky blue grass	7,500 and over	35 and over	10
Setaria splendida	Giant setaria	5,000-8,000	35 and over	Roots
OTHER IMPORTANT SPECIES WHICH OCCUR IN NATURAL GRASSLAND OR AS WEEDS OF ARABLE LAND				
Aristida adscensionis	Common needle grass	0-8,000	10 and over	-
Brachiaria brizantha	Common signal grass	0-9,000	20 and over	-
Chloris virgata	Black seed	0-6,000	15-35	-
Chrysopogon aucheri	Auchers grass	0-6,000	10-25	-
Cymbopogon afronardus	Blue citronella grass	6,000-8,000	30 and over	-
Digitaria milanjiana	Woolly finger grass	0-6,000	15 and over	-
Digitaria scalarum (= D. abyssinica)	African couch grass	0-10,000	20 and over	-
Eleusine jaegeri	Mafutiana or Manyatta grass	8,000 and over	25 and over	-
Eragrostis caespitosa	Cushion love grass	0-6,000	15-35	-
Heteropogon contortus	Spear grass	0-6,000	15-40	-
Hyparrhenia cymbaria	Coloured hood grass	5,000-10,000	25 and over	-

114. Kenya: Important grassland plants (continued)

Botanical name	Common name	Approx. Altitude range	Rainfall	Min. seed rates for pure stands
OTHER IMPORTANT SPECIES WHICH OCCUR IN NATURAL GRASSLAND OR AS WEEDS OF ARABLE LAND (continued)		Feet	Inches	lb. per acre
Hyparrhenia dissoluta	Yellow hood grass	1,000-9,000	25 and over	-
Hyparrhenia filipendula	Fine hood grass	0-8,000	25 and over	-
Imperata cylindrica	Cotton grass ("Lalang" of Malaya)	0-6,000	20 and over	-
Lalipes senegalensis	Hook grass	0-6,000	15-35	-
Lolium temulentum	Darnel	5/10,000	30 and over	-
Panicum deustum	Bush guinea grass	0-6,000	20 and over	-
Pennisetum catabasis	-	5/8,000	20 and over	-
Pennisetum clandestinum	Kikuyu grass	5/10,000	25 and over	-
Pennisetum mezianum	Bamboo grass	1/6,000	15-35	-
Pennisetum schimperi	Wire grass	6,500 and over	20 and over	-
Pennisetum stramineum	Masai grass	1/7,000	15-30	-
Rhynchelytrum repens	Common red top, Rosy grass, or Poverty grass	0-10,000	20 and over	-
Setaria trinervia	Golden setaria	5/9,000	25 and over	-
Snowdenia polystachya	Abyssinian grass	7/9,000	30 and over	-
Themeda triandra	Red oat grass	0-10,000	15 and over	-
IMPORTANT PASTURE LEGUMES WHICH ARE NOW IN COMMERCIAL SUPPLY				
Medicago sativa and M. intermedia	Lucerne	0-10,000	30 and over	3-4
Melilotis alba	Sweet clover, Hubam clover or Bokhara clover	0-10,000	30 and over	10-15
Ornithopus sativus	Serradella	7,500 and over	30 and over	20
Trifolium repens	White clover	5,000/8,500	35 and over	1-1½
Trifolium semipilosum	Kenya white clover	5,000/8,500	25 and over	1-2
Trifolium subterraneum	Subterranean clover	6/10,000	35 and over	6
Clitoria ternatea	Kordafan pea	0-6,000	20-40	10
Glycine javanica	Glycine	0-9,000	20 and over	5-8
Hedysarum coronarium	Sulla	5/9,000	35 and over	30
Onobrychis viciifolia (= O. sativa)	Sainfoin	7,000 and over	40 and over	30
Stylosanthes gracilis	Stylo	0-8,000	20 and over	10
Trifolium burchellianum var. Johnstonii	Johnston's clover	8,000 and over	40 and over	2
Trifolium pratense	Broad red or late flowering red clover	5,000 and over	35 and over	10
Trifolium rueppellianum	Rueppels clover	5,000 + over	35 and over	10
Trifolium tembense	Tembens clover	8,000 + over	35 and over	10

115. Congo belge: Semences et plantes fournis par l'INEAC en 1958

(a) Plantes de cultures industrielles

Aleurites
Cacaoyer
Caféier
Canne à sucre
Palmier à huile
Hevea
Quinquina
Tabac
Théier

(b) Plantes alimentaires

Arachide
Céréales
Coïx
Colocase
Eleusine
Haricots
Igname
Maïs
Manioc
Mil à chandelle
Patate douce
Pois cajan
Pois divers
Pomme de terre
Riz
Sorgho
Espèces diverses

(c) Plantes fourragères

Canna edulis
Graminées diverses
Mucuna
Paspalum notatum
Pennisetum
Stylosanthes
Symphytum
Espèces diverses

(d) Plantes fruitières

Agrumes
Ananas
Avocatier
Bananier
Cerisier du mexique
Chérimolier
Cocotier
Eriobotrya japonica
Figuier
Fraisier
Goyavier
Grenadier
Grenadille
Mangoustanier
Manguier
Mûrier
Néflier
Pacanier
Pachira
Pêcher
Poirier
Pommier
Prunier
Vigne
Espèces diverses

(e) Plantes oléagineuses diverses

Ricin
Tournesol

(f) Plantes d'ombrage, de couverture et d'engrais verts

Albizia
Calopogonium
Canavalia
Cassia
Crotalaria
Croton haumanianus
Desmodium intortum
Leucaena de Buitenzorg
Leucaena glauca
L. pulverulenta
Lupin
Mimosa invisa var. inermis
Phyllanthus discoideus
Pueraria
Vigna
Espèces diverses

(g) Essences de reboisement

Acacia
Cassia
Casuarina
Cupressus
Eucalyptus
Jacaranda
Leptospermum citratum
Pins divers
Essences diverses
Grevillea robusta

(h) Plantes à fibres

Agave
Corchorus
Cotonnier
Fourcroya
Phormium tenax
Ramie
Urena

(i) Plantes à parfum

Vétiver

(j) Plantes ornementales

Amaryllis
Bambou
Carludovica
Conifères
Croton divers
Orchidées
Sansevière
Espèces diverses

(Le Directeur de l'Institut National pour l'Etude Agronomique du Congo Belge, Yangambi, Congo Belge - extrait du Bulletin d'Information de l'I.N.E.A.C., Vol.8, No.5, pp.331-339, octobre 1959)

116. Cyprus: Department of Agriculture, Plant Introduction Section

The report of this Section for the year 1958 is included in the Annual Report for that year, Annexure IV, of the Department of Agriculture, Cyprus, being the Annual Report on Crop Husbandry by J.C. Parisinos, Agricultural Officer (Agronomy), A.I. Syngrassides, Agricultural Superintendent (Forage Extension) and Mrs. A. Soteriades, Agricultural Superintendent (Plant Introduction). Detailed observations were made on 300 perennial grasses provided through FAO and types of Lolium species, Phalaris tuberosa and Dactylis glomerata var. hispanica were selected as the most promising. Work is proceeding on the improvement of Sudan grass, the local variety of lucerne, Lolium rigidum and Medicago tribuloides. A varietal trial of Trifolium pratense was grown on behalf of the National Institute of Agricultural Botany, Cambridge.

117. Turkey: 1st Middle East and South Asian Seed Seminar

The Proceedings of this Seminar, which was held at Ankara, 4/22 May 1959, have been published in booklet form under the title of "Increased Crop Production through Improved Seed Programs". The section on "Plant Introduction and Exchange" is quoted below:-

Chairman: Celâl Bilensoy

Panel: Nedra Basynat, Nuri Benlioglu, Hicret Çaglar, Shihadeh Dajani, Veçdet Erkun, Mirza Gokgol, Zahit Günöven, Carlton H. Ragland, Wm. Haltiwanger

(a) The introduction and exchange of plants between countries offers an excellent means of increasing agricultural production. While much has been done through the efforts of international agencies, it is believed that a great deal more might be accomplished. The world catalogues of wheat, rice, and some legumes by FAO have been particularly helpful in developing the seed improvement program of many countries. It is recommended that FAO should expand this effort as soon as possible to include such other crops as barley, oats and herbages.

(b) The exchange of plant propagating material has been greatly facilitated by the information being afforded through existing efforts of international agencies and groups. It is recognized that the effectiveness of these agencies may be limited by the condition within the countries where there is often no central agency with which to deal. It is recommended that each country would benefit by having such an agency responsible for plant introduction and exchange. These agencies could deal directly with other agencies in their own country and in other countries, and could also serve the international groups. This type of service would be particularly helpful with material that is not included in the world catalogues.

(c) It is generally recognized that the phyto-geographic centers of origin of species are where the greatest diversity of forms is available. Countries should give particular attention to the collection, maintenance, description, testing and definition of environmental conditions of the materials source. The information and material collected under such a program would vary widely in scope. In some instances, the phyto-geographic centers would be very broad and would include a great diversity of types that might often extend beyond national boundaries. In others, the range might be much less. In order that the most effective use be made of this material, two procedures are suggested:

A. Establishment of germplasm collection, maintenance and distribution centers within the phyto-geographic regions. These could logically be by an international agency or through international cooperation.

B. Establishment of central agencies within each country to be responsible for (i) the collection and distribution of germplasm centers wholly within their country, and (ii) exchange of information and material with other countries, and (iii) allocation of it to breeders and agencies within their country. Until such central agencies are created, it will be necessary to use existing agencies and recognized plant breeders in any effective program.

(d) Many techniques and skills are required to provide complete information and to make most effective use of plant collections. The skills and sciences needed are found in many institutions which may contribute materially.

(e) Sanitary precautions must be exercised in the exchange of plant material. It is recommended that the basic principles of the international Plant Protection Association be followed. The agencies responsible for the exchange of plant material also work closely with agencies responsible for the enforcement of quarantine regulations.

(f) Exporters should exercise prudent efforts to fumigate, process or treat plant material according to recognized control methods in order to avoid exporting contaminated materials. However, in order to have effective control, it is recognized that the primary responsibility for sanitary precautions resides with the importer. The importing country needs to establish such rules, regulations and quarantines as are necessary to protect it adequately against the introduction of new plant pests.

(g) In order that the introduction and exchange of propagating material may be facilitated, it is suggested that the development of uniform certificates concerning quality and/or sanitation should be developed. The standardization of control requirements, methods and procedures is desirable provided each country retains the prerogative of determining its own requirements.

118. Pakistan: Food and Agriculture Council

The recommendations of the Pakistan National Seed Campaign Committee for the World Seed Campaign published by the Food and Agriculture Council, Pakistan, Ministry of Food and Agriculture, Karachi, 1959, contains a recommendation in support of plant exploration, collection and introduction on an international basis, involving the organization of new or the improvement of existing plant introduction services with the necessary quarantine safeguards, and the establishment and maintenance of living collections. The improvement work will be confined to the following more important crops in the first instance:-

East Pakistan

(a) Food crops - Rice, wheat, pulses, mustard, sesamum, groundnut, maize and potato.

(b) Cash crops - Jute, sunnhemp, sugarcane and tobacco.

(c) Fruits and vegetables in general.

(d) Forestry in general.

West Pakistan

(a) Food crops - Wheat, rice, maize, gram and potato.

(b) Cash crops - Cotton, sugarcane and tobacco.

(c) Fruits and vegetables in general.

(d) Forestry in general

119. Iran: Seed of grasses and legumes

The following seed samples were collected in 1959 by FAO Field Officer H. Pabot and Associate Expert J.W.B. van der Sprenkel in the catchment area and plain of Khuzistan, and are available in FAO Headquarters. Applications for seeds should be addressed to FAO, Rome, for attention of Crop Production and Improvement Branch.

FAO No.	Species	Total amount available grms	Site of collection
8426	Bromus tomentellus	80	Darun (Zagros mountains)
8427	Cymbopogon laniger	10	N. Dezful (Khuzistan hills)
8428	Hyparrhenia hirta	few seeds	near Behbahan (Khuzistan hills)
8429	Pappophorum persicum	20	N. Dezful (Khuzistan hills)
8430	Aeluropus littoralis (salty soil)	40	E. Ahwaz (Khuzistan plain)
8431	Aeluropus repens (salty soil)	25	Road Masjid-Suleiman (Khuzistan plain)
8432	Pennisetum orientale (limestone)	1	E. Kazeroun (South Iran)
8433	Pennisetum orientale (limestone)	10	S. Isfahan
8434	Cenchrus ciliaris (sandstone)	30	Aga Jari (Khuzistan hills)
8435	Secale montanum	10	E. Khorramabad (Zagros mts.)
8436	Andropogon ischaemum	20	Near Dorud (Zagros mts.)
8437	Melica sp.	15	S. Damaneh (Zagros mts.)
8438	Aristida caerulescens	1	Near Kazeroun (South Iran)
8439	Aristida caerulescens	few seeds	N. Behbahan (Khuzistan hills)
8440	Oryzopsis cf. holciformis	1	NW. Ardekan (Zagros mts.)
8441	Oryzopsis sp.	1	NW. Ardekan (high Zagros mts)
8442	Stipa cf. Barbata	15	Do Gombadan (Khuzistan hills)
8443	Stipa cf. Barbata	4	S. Damaneh (Zagros mts.)
8444	Festuca cf. valesiaca	1	Harigun (Zagros mts.)
8445	Aristida plumosa	30	Behbahan (Khuzistan hills and plain)
8446	Gymnocarpos decander (gypsum)	1	E. Ahwaz (Khuzistan hills)
8447	Zygophyllum sp. (shrub) (gypsum)	20	SE. Hommidiyeh (Khuzistan hills)
8448	Poterium cf. lasiocarpum	1,300	Do Gombadan (Khuzistan hills)
8449	Poterium sp.	90	SE. Khorramabad (Zagros mts.)
8450	Astragalus siliquosus	1,100	E. Malayer (Zagros mts.)
8451	Astragalus sp. (gr. orocephalus)	70	E. Hommidiyeh (Khuzistan hills)
8452	Astragalus chaborasicus	15	SW. Kermanshah (Zagros Mts.)
8453	Lotus sp. (species nova)	5	Road to Nafte-Sefid (Khuzistan hills)
8454	Astragalus hamosus (annual)	4	NE. Ahwaz (Khuzistan plain)
8455	Onobrychis pinnata	200	S. Masjid-Suleiman (Khuzistan plain and hills)

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FAO No.	Species	Total amount available grms	Site of collection
8456	Onobrychis "gypsorum" (gypsum)	50	S. Masjid-Suleiman (Khuzistan hills)
8457	Onobrychis sp.	30	W. Arak (Zagros mountains)
8458	Onobrychis scrobiculata	25	W. Khorramabad (Zagros mts.)
8459	Medicago sativa (wild)	5	NW. Ardekan (Zagros mts.)
8460	Trigonella anguina (annual, salty soil)	10	E. Ahwaz (Khuzistan plain)
8461	Trigonella sp. (short fruit) (annual, salty soil)	5	E. Ahwaz (Khuzistan plain)
8462	Trigonella sp. (long fruit) (annual, salty soil)	1	E. Ahwaz (Khuzistan plain)

120. India: Rockefeller Foundation

The Foundation is undertaking, in cooperation with the Government of India, a project involving the collection, testing, improvement and distribution of millets, particularly sorghums and pearl millet (Pennisetum typhoides). The world germ plasm bank of millets to be established at the Indian Agricultural Research Institute, New Delhi, is to be planned on the same basis as those established by the Foundation for maize germ plasm in Mexico and Colombia.

Millets are very important for the poorest segment of India's population. Various types of millets are grown on about 87 million acres - more than is devoted to any other single crop. Sorgham (jowar) is grown on 42 million acres, second only to rice in importance. Probably about 25% of India's population subsists largely on millets as a staple diet. Yields are, however, extremely low, the average yields of sorghum and pearl millet per acre being only 400 and 250 lbs. respectively. The millets are generally grown on very poor soils where the rainfall is limited and unreliable. The crops are given very little care and rarely see fertilizer.

Dr. Kenneth O. Rachie, specialist in charge of this Rockefeller project, has obtained most of the important sorghum germ plasm from U.S.A., South America and India. He has completed a visit to British East Africa, the Sudan and Nigeria, in November and December 1959, but still requires germ plasm material from other countries such as southern Europe, the countries of the Mediterranean and the Near East, extreme south and western Africa and the countries of the Far East.

The Foundation will provide seed samples of the millets in response to requests from other countries. A fair collection of sorghums has already been formed from Indian, American and African origins, and further intensive collections are planned for western and central India. It is expected that a minimum of 5 to 7 years will be necessary for the collection and evaluation of this material.

Requests for material should be addressed to: Dr. Kenneth O. Rachie, Sorghum Specialist, The Rockefeller Foundation, 20/39 Diplomatic Enclave, Kautilya Marg, New Delhi.

121. India: Cytogeography of some Indian plants

The following is a summary of a lecture delivered by Dr. E.K. Janaki Ammal at the 24th Annual Meeting of the Indian Academy of Sciences, held at Baroda on 29 December 1958:-

"The Plant Geographer is concerned not only with the distribution of plants in Space but also in Time. The primary cause of changes in the distribution of plants seen in the present day, lies in the variation in the distribution of climates. This again is closely related to the changes in the distribution of land and water brought about by cycles of mountain building and the Ice Ages which have always followed these revolutions. The breaking up of the great Gondwana land and the Himalayan uplift took place after the evolution of flowering plants. This has resulted in the dispersion of related families and genera in the continents of South America, Africa, Australia and Peninsular India, all of which formed part of this great land system.

"The analysis of some genera of Indian plants has been correlated with the performance of allied plants in these regions. For this study, chromosome changes and polyploidy have been used as a measure of genetic advance. In such genera as Magnolia and Viburnum, the North Asian tribes which are all diploids, have undergone evolutionary changes resulting in new polyploid species in Eastern Himalayas. The diploid Nymphaea stellata of Kerala is closely related to the Nymphaea of Madagascar and East Africa while the same species occur only as hexaploids in the Gangetic Plain. Hexaploids are also found in Egyptian and European species of Nymphaea. The genus Buddleia probably arose in Africa where only diploids (2n = 38) are found in this genus and allied genera. Amongst Indian species, very high polyploids (2n = 114, 2n = 304) occur in Sikkim and Assam regions.

"Some of the trees belonging to Magnoliaceae which have been identified with fossils are found to be diploids. They may therefore be considered to have remained diploids since their first appearance on the earth! This is true also of some of the gigantic trees of the Humid Tropics of India. We therefore have in these regions a vegetation which is similar to what existed on the earth during Cretaceous times."

(Published in Current Science, Vol.28, No.2, p.55)

122. India: Anglo-American Karakoram Expedition 1960

Mr. O. Polunin reports that a mountaineering expedition will spend 2½ months in the Karakoram Himalaya, Pakistan, in the Hunza and Hispar Glacier region. Mr. O. Polunin will be a member of this expedition but he will spend his whole time on botanical exploration at altitudes ranging from 6,000 to 18,000 ft. He will be making a herbarium collection for the British Museum, Royal Botanic Gardens in Edinburgh, and others, and he plans to investigate the natural plant communities and study some of the problems of plant establishment and survival at high altitudes. A collection of seeds including Gramineae and ornamentals will be made and it may be possible to include collections of cultivated species from the Hunza and Nagyr people.

Mr. Polunin's address is: Dormers, Farncombe Hill, Godalming, Surrey, England.

123. Taiwan: Activities of Joint Commission on Rural Reconstruction

Two documents have been received from the Plant Industry Division, Chinese-American Joint Commission on Rural Reconstruction, Taipei, Taiwan, China, both dated April 1959. The first, entitled "A second report of JCRR's activities on international exchange of plant material" by H.S. Chang, gives the concrete results which have been obtained from the trial of over 400 varieties of food crops, fibre crops, forage and cover crops, vegetables, fruits and other miscellaneous crops which were introduced into Taiwan between November 1951 and May 1956.

The second publication is a "List of plant materials in Taiwan available for international exchange".

124. Japan: National Institute of Genetics, Misima

For some time Dr. H. Kihara has been studying the origin of cultivated rice with the assistance of a grant from the Rockefeller Foundation and in association with Drs. Takenaka, Sakai, Matsumura, Oka and Furusato. In October 1959 Dr. Furusato visited certain African countries with the intention of studying and collecting wild species of Oryza, particularly in Guinée, Sierra Leone and Kenya.

125. Australia: Plant Introduction Section, Division of Plant Industry, C.S.I.R.O., Canberra

The following publications have recently been received:-

Quarterly list of introductions No.56 (Inventory of plants introduced during the quarter ended 31st March 1959)
Quarterly list of introductions No.57 (Inventory of plants introduced during the quarter ended 30th June 1959)
Quarterly list of introductions No.58 (Inventory of plants introduced during the quarter ended 30th September 1959)

126. New Guinea: Collection of sugar cane

Dr. E.W. Brandes, who was one of the earliest collectors of sugar cane in Papua, arrived in Papua and New Guinea in October 1959 to carry out an advance survey for the proposed botanical expedition of the United Fruit Company to assemble a World Reference Collection of Wild and Domesticated Varieties of Bananas for use in breeding for disease resistance. It is understood that Dr. J.J. Ochse is conducting a similar preliminary survey in Netherlands (West) New Guinea. The exploration work is planned in four stages, possibly with different field parties: (i) Papua and New Guinea, Solomon Islands, Netherlands New Guinea and Indonesia; (ii) Philippines, North Borneo, Brunei, Sarawak; (iii) Singapore, Malaya, Thailand, Burma, Assam, Sikkim; (iv) French Oceania, New Caledonia, New Hebrides.

(Information provided by G.P. Keleny, Port Moresby, 13 December 1959)

127. New Zealand: Unintentional introductions

"Untentional or incidental introduction of weed species into New Zealand has been, and still is effected by diverse means, several of which have been reported by botanists from 1786 to the present time.

"This note is concerned with three examples of such introduction, and the significance of the particular means of introduction.

"The first example is a straw envelope off a whisky bottle, picked up from a rubbish heap on a North Canterbury farm. Fig. 1* shows the envelope cut and flattened out, with a flowering stem of bindweed (Calystegia sepium (L.) Roem. et Schult.) on extreme right. Fig. 2* shows portions of inflorescences of tall oat grass (Arrhenatherum elatius (L.) J. et C. Presl) and a bent grass (Agrostis sp.), together with the flowering stem of bindweed, all dissected out from the straw of the cover.

"Apart from the circumstances that the bindweed was in the non-seeding stage, and that one, and possibly both of the grasses already occur in New Zealand, the important features are - (i) that such envelopes provide an entry for plants into New Zealand; (ii) that such containers when discarded are generally thrown on rubbish heaps and other suitable sites for weed establishment; and (iii) that some fruits, at least, of the two grasses were viable.

"The second instance was that of a plate-glass container from an English source, examined in the Wellington district. This crate contained a quantity of wheaten straw (Fig.3*) in which were found large non-flowering portions of Californian thistle (Cirsium arvense (L.) Scop.), cleavers (Galium aparine L.), willow weed (Polygonum cf. lapathifolium L.), with ripe fruiting material of Beta sp., nipplewort (Lapsana communis L.) and a hemp nettle (Galeopsis sp.).

"When examined, this straw was exposed to the wind adjacent to a vacant area of waste land, and information was given that the straw was used locally for compost heaps and garden purposes. I noted also that it was being used as crate material in racing-pigeon cages, which cages are dispersed through the country for sporting purposes: these cages are, incidentally, usually disposed about railway stations, etc., where suitable conditions for weed establishment exist.

"The third instance is introduction of fruits and seeds in turn-up cuffs of trousers. The fruits (Fig.4*) had lodged in cuffs of a traveller's clothes during a trip through Spain, southern France, Switzerland, and Italy; the quantity and variety would no doubt have been greater had the travelling been done later in the fruiting season.

"The fruits (not all identified) were mainly representative of the grass family (Gramineae), with a smaller number from the daisy family (Compositae), and a spore-bearing fragment of a fern frond.

"This unintentional collection of fruits by tourists could be responsible for introduction of serious weeds into New Zealand, this being especially so with returning parties of farmers. The turning out and cleaning of tourists' trouser-cuffs prior to return to New Zealand, or burning of the material if removed on arrival would be in the interests of agriculture. The throwing out of trouser-cuff debris on the rubbish heap or bare garden might result in a crop of weeds."

* see original article

(HEALY, A.J. 1959. Unintentional introduction of plants into New Zealand. N.Z. Journal of Agricultural Research, Vol 2, No 2, April 1959, pp 312-3)

128. South Pacific Commission

We have received recently the following documents:-

Plant Collection and Introduction Newsletters Nos. 4, 5, 6 and 7.

Bamboos for the Pacific Islands, by F.A. McClure, published in instalments in the South Pacific Commission Quarterly Bulletin for April, July and October 1958. 11 p.

Catalogue des plantes utiles aujourd'hui présentes en Polynésie française, par J-N. Maclet et J. Barrau, publié dans le Journ. d'Agric. tropicale et de Botanique appliquée, T.VI, No.1-2-3, Janv.-Fév.-Mars 1959.

Plant Introduction List No.7 of the Department of Agriculture, Fiji.

129. U.S.A.: National Seed Storage Laboratory, Fort Collins, Colorado

The following statement was prepared by New Crops Research Branch, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, October 1958:-

The Crops Research Division, ARS, has responsibility for the administration of the National Seed Storage Laboratory through its New Crops Research Branch. Dr. Edwin James, Director, and Dr. L.N. Bass, Seed Physiologist, compose the professional staff at the Laboratory.

The Laboratory building is constructed on three levels. Refrigeration-dehumidification equipment, control instruments, a repair shop, a garage, general storage, and seed cleaning rooms are on ground level. Offices, library and file space are on the second level, seed-storage rooms and germination laboratory are on the third level. Nine of the storage rooms provide independently controlled temperatures ranging from 20 to 40 degrees F. and can be brought down to a relative humidity of 35 percent. A tenth and smaller room provides a controlled temperature range of 0 to 35 degrees F. at the same humidity level. A small low-temperature, high-humidity room provides a facility for germinating hard seeds by the stratification technique. The Laboratory's capacity can be indicated by the estimate that if the average sample of seed stored was 1 pint, about 250,000 such containers could be held by the Laboratory.

The Agricultural Research Service requested a 6-member advisory group to make recommendations on broad policies for the Laboratory as a national facility. The members of this group are D.W. Robertson (Colorado) and W.M. Meyers (Minnesota) representing State Experiment Stations; F.L. Winter (Assoc. Seed Growers, Inc.) representing the Natl. Council of Commercial Plant Breeders; E.M. Page (Corneli Seed Co.) representing the American Seed Trade Association; H.A. Rodenhiser and C.O. Erlanson, representing the Agric. Research Service. The statements and recommendations made by this group and listed below have been accepted as general policy by the Agricultural Research Service.

(a) The Laboratory is a federal facility and all seed accepted for storage becomes federal property.

(b) Only seed will be accepted for storage.

(c) Valuable seed stocks will be accepted from federal, State and private institutions and individuals. The basic criterion of acceptability will be its value as germ-plasm for future use and comparison. Documentation as to value will be required, along with other information as to source and developmental history.

(d) Any bonafide research worker of the United States, its territories or possessions may receive seed from collections stored at the Laboratory. However, seed will not be issued if readily available elsewhere.

(e) The Laboratory will have no responsibility in relation to commitments with foreign countries. All requests from foreign sources will be channeled to headquarters of the New Crops Research Branch at Beltsville, Md., where decisions in relation to foreign countries will be made.

(f) A series of crop-group informal committees will be established by the Agricultural Research Service to advise the Laboratory Director as to valuable stocks to be held, sources when known, proper documentation, and to expedite the movement of these stocks to the Laboratory. These committees will work directly with the Laboratory. The responsibility for acceptance of seed lies with the Laboratory Director or his superiors and the committees will not be expected to screen stocks for the Laboratory.

(g) No seed will be held by the Laboratory for the exclusive use of one or more agencies, organizations or individuals. Once accepted by the Laboratory, the seed will be available to any research worker subject to such limitations asare here laid down.

(h) The Laboratory will not be a procurement agency for seed. The Laboratory will only furnish seed from stocks it is holding.

(i) The Laboratory is not a warehouse or seed distributing center. The Laboratory will not hold bulk supplies or seasonal stocks. Rather, it is a germ-plasm bank for valuable stocks to be held over the years for the use of research workers when needed.

(j) The Laboratory will issue periodic inventories of the stocks held in storage to inform research workers of material available.

(k) The Laboratory will be responsible for the rejuvenation or replenishment of seed stocks held.

(l) No charge will be made by the Laboratory for the service of furnishing seed. The Laboratory will use every care in keeping good records, but is not responsible for errors which may occur in the documentation.

(m) Fresh clean seed is one criterion of acceptability by the Laboratory. Periodic germination tests will be made as considered necessary.

(n) The principal objective of the Laboratory is long-time holding of valuable seed. Research projects will be carried on at the Laboratory related to the Laboratory's objective, i.e, physiological problems in seed viability and longevity.

130. U.S.A.: Collections in southern Europe, Mediterranean and Near East Regions

Reports have been received of the expedition by Dr. Howard S. Gentry in the Dinaric Alps, Yugoslavia, already mentioned under item 47 of this Newsletter; also of the expedition by Dr. P.F. Knowles for safflower and miscellaneous oilseeds in the Near East and Mediterranean countries, March to October 1958, also referred to in item 47.

131. U.S.A.: American Association for the Advancement of Science Symposium on Germ Plasm

A three-day Symposium on the subject of germ plasm as applied to animals as well as plants was held by the American Association for the Advancement of Science in Chicago from 28 to 30 December 1959. The theme throughout the Symposium dealt with the necessity for preserving all kinds of germ plasm which would otherwise eventually be lost for ever.

The following is an abstract of a paper presented to this Symposium by Dr. H.A. Rodenhiser, Assistant Administrator, Farm Research, Agricultural Research Service, U.S. Department of Agriculture, Washington, entitled "Need for and utilization of additional sources of germ plasm":-

"Current world collections have been fairly adequate in meeting our needs for germ plasm with which to keep abreast of many of the major crop problems in the United States. Success, however, may be temporary as present varieties may not be adequate to resist attacks of new races and biotypes of pathogens and strains of insects which repeatedly appear and limit the usefulness of otherwise desirable varieties. There is the added menace of diseases and races of pathogens, insects and insect vectors present in other countries of the world for which we must be prepared in the event they become established in North America. Among the latter of immediate concern are the "enanismo" disease of cereals in Colombia and Ecuador, sugarcane smut in several countries of the world, yellows disease of sugar beets in Chile and Argentina, and a bacterial stalk rot of corn in India. Expanded research for new germ plasm, more detailed evaluation of current stocks in our world collection, identification of parasitic races of pathogens on an international scale, and basic research to determine limits of pathogenicity of races must be undertaken if we are to more effectively combat our various production hazards of disease and insect attacks, cold or frost injury, and drought.

"Screening, storing and evaluation of large and small animal germ plasm banks are more costly and present difficulties not encountered in farm crops. However, the economic benefits which should be derived would seem to justify intensification of research in this field. The proposal for establishment of an inter-regional project for a "National Bank for Farm Animal Germ Plasm", providing a facility to acquire, preserve and distribute frozen semen as a service to Federal and State agricultural experiment stations, is a step in the right direction."

132. Canada: University of Alberta, Department of Plant Science

Mr. K. Lesins, Associate Research Professor in Forage Crops, is interested in obtaining some species of Medicago, for which he has been looking for several years. These include the perennials Medicago papillosa M.B., M. rupestris M.B., M. saxatilis M.B. and M. pauciflora Ledeb., which he believes are likely to be found in eastern Anatolia, Turkey, and in the region of Tabriz in northern Iran. Among the annuals, he is interested in M. lanigera Winkl., possibly to be found in northern Afghanistan, and in M. noëana Boiss., M. elegans Jack. and M. agrestis Ten., endemic to Syria. Mr. Lesins would appreciate the assistance of any specialists who might be collecting in these regions with respect to the species of Medicago referred to above.

133. Puerto Rico: University Agricultural Experiment Station, Rio Piedras

The staff of the Department of Plant Breeding has kindly offered to provide (in exchange) to enquirers germ plasm of a number of crops including Coffea, Rubus and local commercial varieties of fodder grasses and legumes, sugar cane, maize, beans, tomatoes, tobacco, star apple, annonas, West Indian cherries, guava, ornamentals, etc.

Mr. T. Singh Dhaliwal, Associate Plant Breeder, would be interested in receiving cultivated and wild strains of Carica papaya for use in a breeding programme, the major objective of which is to develop superior varieties resistant to various diseases such as bunchy top and southern coast mosaic. He is also interested in vines, Rubus, loquat, litchi, peach, guava, naranjilla, strawberries, etc. from tropical regions.

134. Peru: Second Panamerican Seed Seminar

Committee I of this Seminar dealt with:-

SEED INTRODUCTION AND RESEARCH

President: Luís E. Rangel de Sousa Britto (Brazil)
Secretary: Humberto Gandarillas (Bolivia)

Jorge Parrado (Cuba)
Luís M. Castillo (Guatemala)
Jacques Dolce (Haiti)
Carlos Pineda (Nicaragua)
Benjamín Guijandría (Peru)
Hernán Oropeza (Venezuela)
Erwin Brooks (Honduras)
Florinda E. Ibarra (Argentina)
Carlos Ochoa (Peru)

Spokesman: José Carreras (Peru)

Subject Matter for Disscussion:

(i) Adaptation of programs to the most urgent needs of the country.

(ii) Maintenance of a closer contact among technicians in their respective fields to enable the interchange of results.

(iii) Basic research work for seed production and the need of:

(a) Maintaining the germplasm in its natural conditions;
(b) Keeping a full record of the improved varieties; and
(c) Regulating the control of personnel in charge of seed improvement.

(iv) Regional work for crop improvement when the programs are of interest to the respective agriculture.

(v) Maintenance of information and improved varieties for distribution among the cooperating countries.

The resolutions of this Committee were directed toward the unification of efforts of technicians working under similar conditions in their respective countries, by making available information and plant material for crop improvement. It recommended the following:

(i) That in order that the technician from the Latin American countries may become acquainted with the work being done in other countries, a list of all publications related to seed improvement published by the technician should be sent to the Executive Secretary of the Seed Improvement Seminar for compilation and circulation.

(ii) That in order to preserve the germ plasm of native plant materials, each country should cooperate in establishing a germ plasm bank and all material should be made available for interchange among technicians of other countries.

(iii) That each country make a list of all crop varieties now being commercially grown giving the origin, botanical classification, area of adaptation, plant characteristics, and other pertinent information, the list to be made in standard form and sent to the Executive Secretary of the Seminar and made available to all countries.

(iv) That countries with common problems intensify their work in seed improvement on a regional basis.

135. Argentina: Nomenclature of Argentinian wild potatoes

The following is a summary of an article by Dr. H. Brücher, of the Estacion Experimental del Ministerio de Agricultura, Lujan, Mendoza, Argentina:-

Continuing the critical publications on the nomenclature of Argentinian wild potatoes, started in 1956, the results of 5 years' studies of the series Acaulia are now discussed. This series is to be found in the highlands of the Cordilleras and its vegetation limit is approximately 4,700 m. above sea-level. The frost resistance of Solanum acaule and S. aemulans is remarkably high (to minus 10°). Cytological determinations have again proved the previously known number 2n = 48 for S. acaule. In the province of Jujuy a "species" with 2n = 36 has also been found which is probably a hybrid of S. acaule and S. alticolum, and which is spreading more and more in certain arid areas at an altitude of 4,000 m. The chromosome number 2n = 24 for S. aemulans is published for the first time. Reciprocal crosses under greenhouse conditions between S. aemulans (2n = 24) and S. acaule (2n = 48) showed no success. Contrary to other views the author insists that S. aemulans is a good species endemic in the arid mountains of Famatina and Ambato in the provinces of La Rioja and Catamarca. Having been last collected in 1907, S. aemulans has again been found by the author in the Famatina mountains.

With regard to S. acaule and its numerous varieties and related species, the author holds the opinion that the terms S. depexum, S. schreiteri, S. punae, S. subexinterruptum, S. checcae, S. caulescens, S. chorreunse are superfluous and that the real range of variability is much greater. Examples are given illustrating this point of view.

S. acaule has gained considerable importance for plant breeding by its valuable genes resistant to Rhizoctonia, frost and virus, and for this reason it is thought more necessary to elucidate the systematic and cytological problems of the whole series Acaulia.

(BRUCHER, H. 1959. Kritische Betrachtungen zur Nomenklatur argentinischer Wildkartoffeln. V. Die Serie Acaulia. Der Züchter, Vol.29, No.3, pp.149-156)

136. Brazil: Guide to the arboretum of the Plant Introduction Section, Instituto Agronômico, Campinas

The importance of plant introduction work cannot be over-emphasized. It is a common fact that many of the most important crops in various countries were originally introduced from abroad.

The Instituto Agronômico do Estado, Campinas, São Paulo, maintains a Plant Introduction Section which is constantly engaged in introducing new species or varieties of plants that might be of economic or scientific interest for the country. In many cases new plants are obtained on an exchange basis made with agricultural scientific institutions in various parts of the world. The work of the Plant Introduction Section is carried out in close collaboration with the Federal and State Plant Quarantine Service to avoid the introduction of diseases or insect pests that do not occur in the country.

Introduced seeds are first recorded and then a small seed sample is withdrawn for exhibiting purposes. The remaining seeds are treated against insect pests and diseases and then referred to the various departments of the institution which may be interested in them.

An arboretum of species that might be of future interest for the institution is maintained at the Central Experiment Station, Campinas. The trees in the arboretum represent but a fraction of the total number of introductions. A list of the species in the arboretum, with information such as introduction number, common and scientitific names, origin, uses, etc., is given in the guide. (Summary).

(GERMEK, E.B. 1960. Guia do arboreto da seção de introdução de plantas. Bulletin No.115 of the Instituto Agronômico, Campinas)